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NOTES ON GEOGRAPHIC DISTRIBUTION

Amphibia, Anura, Ceratophryidae, *Batrachyla leptopus* Bell, 1843: New records updating and geographic distribution map, Chile

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ABSTRACT: A new locality and an updated distribution map to B*atrachyla leptopus* Bell is provided herein. The new record extends in 200 km the distribution range of this species and constitutes the northernmost record until today. Finally, the present results are discussed in the Amphibian declining frame, bearing in mind the importance of these records and additional information to future conservation strategies in the study area.

At present, the genus *Batrachyla* Bell, 1843 comprises five species of frogs inhabiting at southern part of South America. *Batrachyla antartandica* Barrio, 1967, *B. leptopus* Bell, 1843, and *B. taeniata* (Girard, 1854) occur in both Chile and Argentina (Formas 1979); *B. nibaldoi* Formas, 1997 is restricted at south of Chilean territory (Formas and Brieva 2000), and *B. fitzroya* Basso, 1994 is known only from the type locality, Isla Grande of the Melendez lake (Argentinean Patagonia) (Basso 1994). Currently, the taxonomic status of the five species of *Batrachyla* is well defined (Cuevas and Formas 2008; Frost 2009); however, based on molecular information its generic relationships were recently revised and the genus was relocated from Leptodactylidae to Ceratophryidae, besides *Atelognathus* Lynch, 1978 in the subfamily Batrachylinae (Frost *et al.* 2006; Frost 2009).

The four *Batrachyla* species described for Chile (*B. antartandica, B. leptopus, B. nibaldoi*, and *B. taeniata*), undergo a broad distribution along the temperate forest of *Nothofagus* and also outside of these woody environments in the semiarid steppe in central Chile (Formas 1979), such is the case of *B. taeniata* reaching the locality Quintero (32°47' S, 71°32' W) in their most northern limits (Brieva and Formas 2001), presenting for this fact the wider distribution among the Chilean frog's species.

Batrachyla leptopus is the genotypic species and was initially described by Bell (1843) based on a specimen collected in the locality of Valdivia by Charles Darwin during the Voyage of the H.M.S. Beagle (Cei 1962; Busse 1971). Historically, a wide distribution have been documented to *Batrachyla leptopus* within the limits of temperate *Nothofagus* forest, being collected from the Coastal Range in the west to the Andes Mountains in the east (Formas 1979; Díaz-Páez and Ortiz 2003; Cuevas and Formas 2005), and from the Nahuelbuta Range (sympatric with *B. taeniata*, in their northern distribution; 37°18' S, 73°17' W) (Formas and Brieva 2000) to the Patagonian channels (sympatric with *B. nibaldoi*, in their southern range; 46°25' S, 72°04' W), including the Chiloé Island where is sympatric with *B. taeniata* and *B. antartandica* in the same place (Formas 1997; Díaz-Páez and Ortiz 2003). Recently, specimens of this species were located in the Drainage of the Rio Baker (XII Region) (Ortiz and Díaz-Páez 2006) which might constitute its southern distribution (Figure 1).

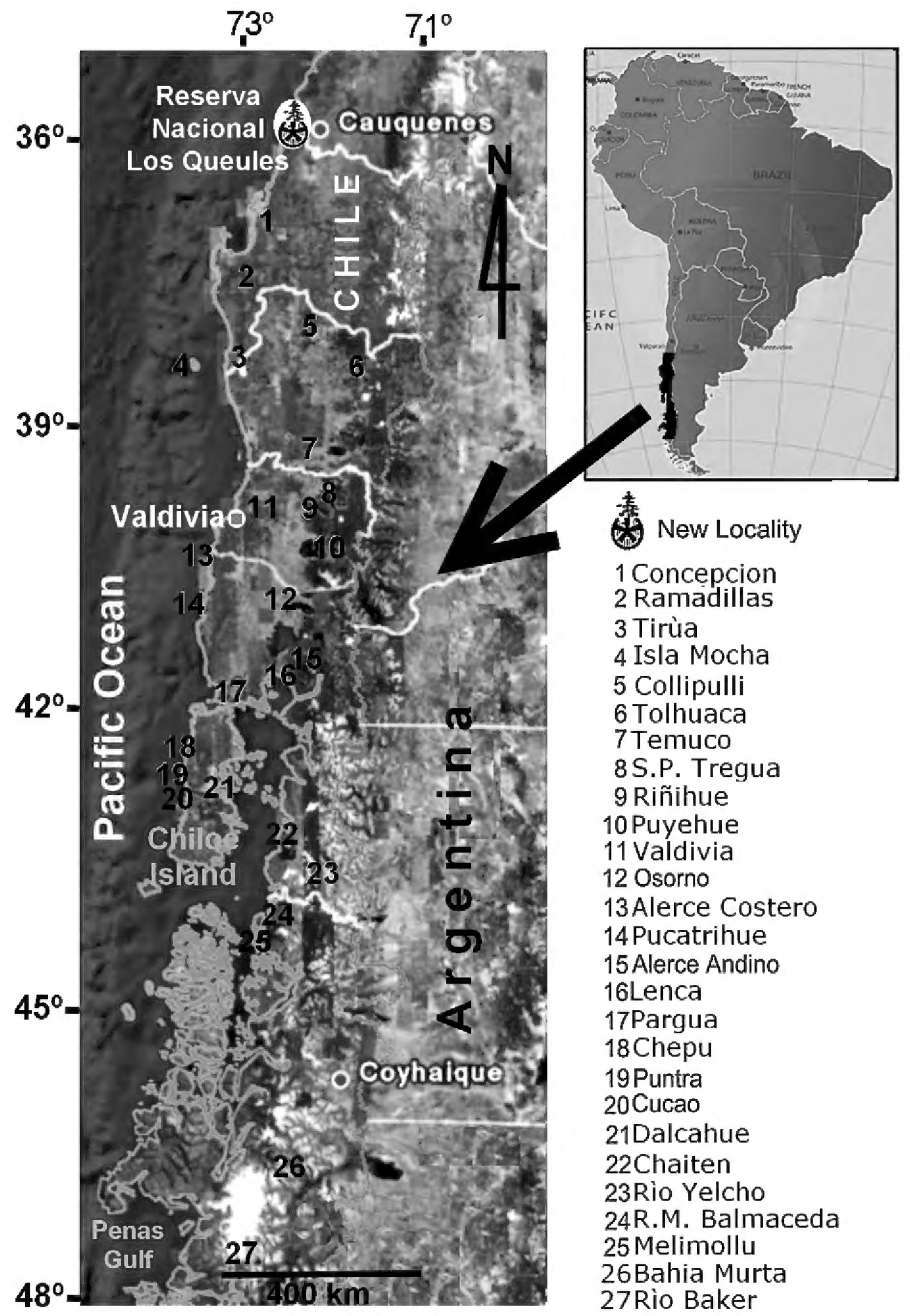

FIGURE 1. Distribution map of *Batrachyla leptopus* showing historic localities (asterisks) and the new record site in Los Queules National Reserve (symbol).

Concerning the biogeography of *Batrachyla*, *B. leptopus* is one of three species that also are present in the oriental hillsides of the Andes Range, in the area where the temperate *Nothofagus* forest penetrates towards the argentinean side (Formas 1979). The others two species are *B. antartandica* and *B. taeniata* (Cei 1980), reaching the latter the relicts forest of Quintero in their septentrional distribution (32°47' S, 71°32' W, Fifth Region of Chile) (Brieva and Formas 2001). On the other hand, *B. fitzroya* and *B. nibaldoi* are species with more restricted distributions; the former is micro endemic of the Isla Grande of the Melendez Lake in the western slopes of the Andes (Basso 1994) and the latter is endemic to the south of the Patagonia (Puente Traihuanca, Coihaique; Formas 1997) where new populations have been located (Díaz-Páez and Ortiz 2003; Rabanal 2010). Probably, the endemism condition shared by *B. fitzroya* and *B. nibaldoi* is due to the fact that they correspond to more recent speciation processes (Cuevas and Formas 2008).

From east to west the Chilean territory is shaped by three principal geographical formations: Andes Range, Intermediate depression, and Coastal Range (Formas 1979). In the Andes Range the northern record to *B. leptopus* keep up a correspondence with the Tolhuaca National Park (38°12' S, 71°48' W; 920 m altitude; Cuevas and Formas 2005) and in the intermediate depression it has been registered in the Collipulli Valley (37° S, Cuevas, pers. obs.), in both localities in sympatry with *B. taeniata*. In Coastal Range *B. leptopus* had never been reported north of the Bio-Bio river mouth, being their septentrional record in Concepción (37°01' S , 73°13' W) (Formas 1979; Diaz-Páez and Ortiz 2003).

The new locality, National Reserve Los Queules (Permit N° 05/08 of the Forest National Corporation) (35°59'19" S, 72°41'25" W; 87 m.a.s.l.), is located 60 km south of Cauquenes by road, and 22 km south of the small city of Curanipe (Figures 1 and 2) in the Seventh Region of Chile. This new record extends *ca.* 200 km to the north the *B. leptopus* distribution, which previously has been cited only between VIII and X Region (Formas 1995; Díaz-Páez and Ortiz 2003). Both the presence and the specific identification of the new material was first corroborated by listening a mating call of a male in April of 2007 (Austral autumn season) outside of the forest guardhouse. *Batrachyla leptopus* has a very characteristic call differing notoriously from those of *B. taeniata* and *B. antartandica* (Penna 1997). Considering that *B. taeniata* distribution ranges among 48° LS and the relicts forest of Quintero at 33° LS, the available geographical records to *B. taeniata* and *B. leptopus* indicate to us that both species might superpose its distribution in this area; however this hypothesis must be checked on.

A tadpole specimen (Figure 2B; stage 39, Gosner 1960) was collected on 18 August 2008, 2 km before the Reserve Los Queules at the border of a road near of a small stream of 50 cm wide and 10 cm deep (Figure 2D). The specific status was confirmed by squashing a little piece of tail and determining its chromosome number which was 2n = 26, NF = 52 (Figure 2C). *Batrachyla taeniata* and *B. antartandica* also share this same diploid number, however both species differs from *B. leptopus* in their FN (50) because the presence of a telocentric pair (12) (Cuevas and Formas 2008). In addition, *B. taeniata* has not been collected here until now. On the other hand, *B. antartandica*

FIGURE 2. A: Male specimen of *Batrachyla leptopus* from the new locality. B: Tadpole of *Batrachyla leptopus* of Los Queules. C: Basic karyotype of *Batrachyla leptopus* from Los Queules. D: Panoramic view of the border of Los Queules. Bar equal 0.7 cm.

have their septentrional distribution documented in San Pablo de Tregua (39°36'46" S, 72°05'28" W in the Andes Range; Cuevas and Ugarte 2008) and in Mehuín (39°25' S, 73°12' W) in the Coastal Range (400 km south of the new locality here reported).

The definitive proof about the presence of *B. leptopus* in Los Queules was acquired in a fieldtrip carried out on May 2009 with Dr. José Núñez and Felipe Rabanal, when adult specimens of *Batrachyla leptopus* (Figure 2A) were collected into the Reserve. They were localized in the interior of the forest among the soil liter (dry leaves) in a low area that will be flooded in winter. In this period this species is in mating time and actively calling males are easily detectable.

Cei (1962) reported a notable morphological variation (size and color polymorphism) in specimens of *B. leptopus* from different localities. Formas and Brieva (2000) conducted a genetic analysis of this species, reporting a moderate inter-population genetic variation supporting only partially Cei's observations, probably, because part of the variation mentioned by Cei (1962) corresponds to specimens which were described after as *B. antartandica* by Barrio (1967). Despite this, *B. leptopus* shows a significant color polymorphism as illustrated in Figure 3, which is important to take into account at the moment of recognizing it.

In the last four decades, the woody ecosystems of Coastal Range (among 33° to 38° SL) has been severely disturbed and destroyed, mainly because of anthropogenic productive activities, such as agriculture, and forestry industry (Little *et al.* 2009) (Figure 2D). In summer, season forest fire (accidental or intentional) is also an important cause of native forest lost. All these threats have important consequences in the quality and quantity of disposable habitat to the frogs, one of the most important causes of its declining (IUCN 2006). In this frame, the finding of *B. leptopus* in Los Queules National Reserve is not only the extension of his distribution range out of the temperate *Nothofagus* forest, but, also provides evidence that the knowledge of the Chilean fauna is incomplete and in many cases the current information responds to accidental findings and not to planned investigations. This statement is corroborated by the fact that in the last five years, in the remnants of Maulino forest [area where is located the new site reported herein (Los Queules) to *B. leptopus*], two new species of *Eupsophus* (*E. quelensis* and *E. septentrionalis*) were described, a new population of *Telmatobufo* (Cuevas and Cifuentes 2009) was detected, and a new species of *Alsodes* is in process of description (Cuevas unpublished data).

In the context of the global amphibian declining (Collins and Halliday 2005), all this antecedents encourage a more decided enterprise to carry on a complete survey with the main objective of assembling a base line data, in order to work on a conservation strategy, since this area of the Coastal Range of Central Chile is highly vulnerable due to deforestation and poorly known from the herpetofaunal viewpoint.

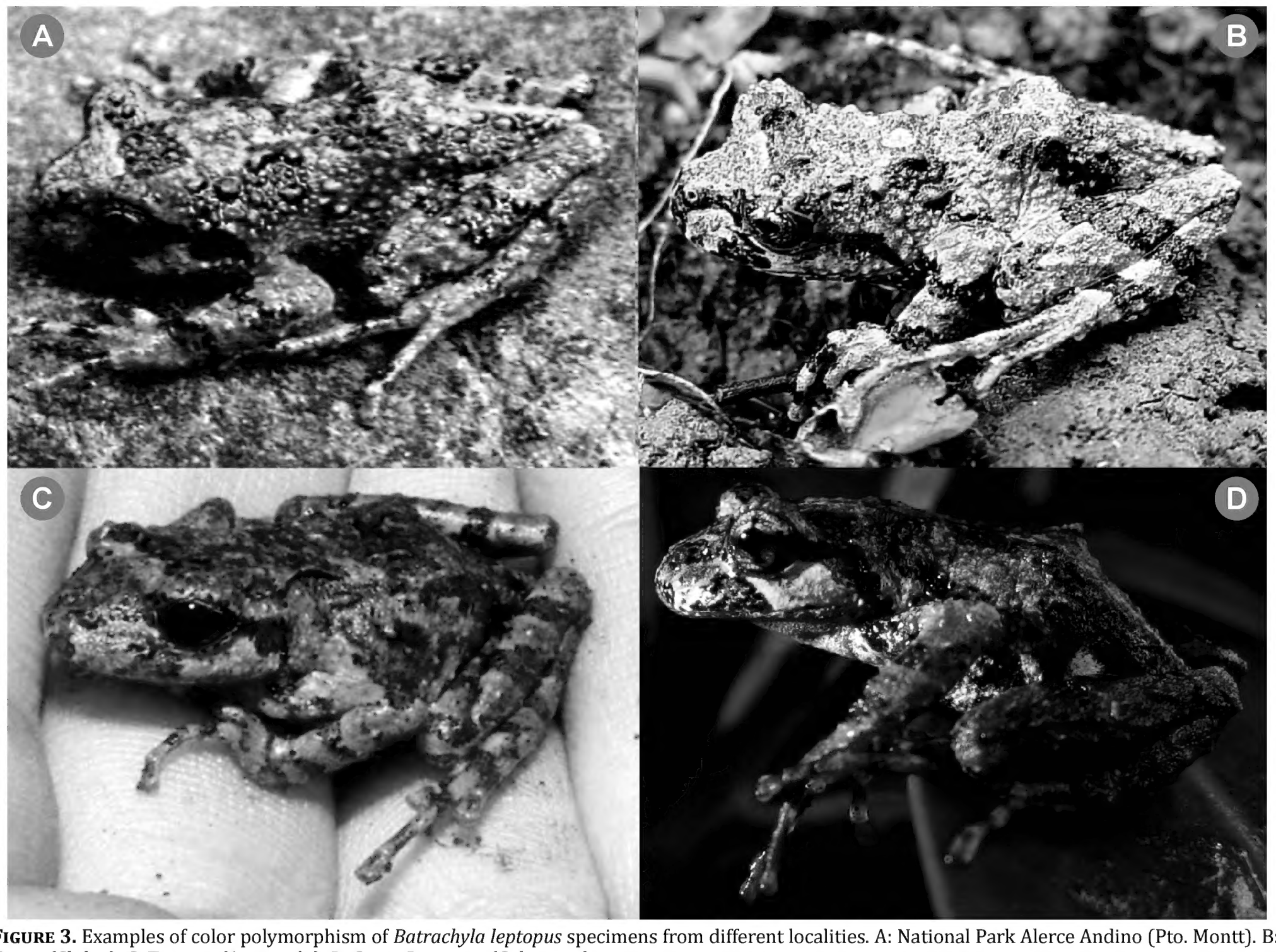

FIGURE 3. Examples of color polymorphism of *Batrachyla leptopus* specimens from different localities. A: National Park Alerce Andino (Pto. Montt). B: Cucao (Chiloe). C: Temuco (Araucanìa). D: Santo Domingo (Cohiaique).

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